An Introduction and Overview to Google Apps in K12 Education: A Web-based Instructional Module

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Abstract: The question of how to provide K12 teachers with "just-in-time" professional development opportunities during a time when the need for fiscal restraint has cut the time available for professional development is a vexing one for educators. A key to preparing K12 students for success in the 21st century is to provide them with the skills and aptitudes that will enable them to be digital producers and collaborators in higher education and in the workplace. This will not happen until teachers in K12 institutions themselves develop these skills. A preliminary survey indicated that participants in this instructional module were consumers of digital technology; that is, they utilized smartphones, cloud services, and web-based mail. The survey also indicated a lower familiarity with the use of Google tools for production and collaboration. This was more pronounced for the K12 educators who responded. An *Introduction and Overview to Google Apps in K12 Education* utilized web-based instruction to provide an brief survey of the capabilities of Google Apps for K12 education and is designed to be a precursor to specific content-based instructional modules for the use of Google Apps by teachers. The data collected through the post-module survey as well as through open-ended responses in some of the sections provided information about the respondents' impressions concerning the efficacy of providing "just-in-time" instruction via website, impressions about the usability of the module, and recommendations for improving the module.

Introduction

The U.S. Department of Education in its first National Education Technology Plan, has stated that schools must use technology to provide students with "...engaging and powerful learning experiences. Technology based learning and assessment systems will be pivotal in improving student learning." (Department of Education, 2010). It is the practices, knowledge, and skill sets of the teachers that have the most immediate impact on whether students are able to acquire the skills and aptitudes that will allow them opportunities for school success (Archambault, Wetzel, Foulger, & Williams, 2010).

There are discrepancies between what many teachers in the K12 setting need to know and

be able to do in a 21st century school and their present levels of knowledge and practice. The National Educational Technology Plan states this explicitly in the Executive Summary. "Many of our existing educators do not have the same understanding of and ease with using technology that is a part of the daily lives of professionals in other sectors." (Department of Education, 2010).

This project was concerned with providing a web-based module to introduce the capabilities of the Google Apps suite of tools to K12 teachers. The Google subdomain solution is attractive to schools for several reasons: besides being free to educational institutions, it can supplement or supplant the use of a number of other proprietary applications. It is platform independent since it is web-based and it offers the attraction to education of supporting the 21st century goals of collaboration and digital productivity (Nevin, 2009).

If K12 students in the United States are expected to become college and career ready by the time the graduate high school, it is reasonable that they should be familiar with the tools they will be expected to use in their post K12 lives. Students who plan on attending colleges and universities will very likely be expected to have a working grasp of Google tools. The Official Blog of Google in Education states that Google Apps have been adopted by "seven of the eight Ivy League universities and 72 of this year's top 100 U.S. Universities (as determined by 2013 *U.S. News and World Report*'s ranking)" (Google, 2013)

While at least 105 of Hawaii's public schools have taken advantage of the Google subdomain made available at no cost to educational institutions, its general use has been limited and localized even within a school (Quach, 2012). Of the schools that have the subdomains, usage of this cloud-based solution is spotty at best. Many teachers in the public schools are not even aware that their schools have this resource.

Part of the problem of limited knowledge and use of this resource derives from the significant loss of school time that can be devoted to professional development. Fiscal constraint has resulted in the elimination of days devoted to professional development activities in the schools, while demands on teachers' time have increased. The challenge is to provide a means for teachers to engage in professional growth that is "fluid in time and place and is customized" (Wind & Relbstein, 2000) to their specific needs in an environment where time is at a premium.

Methods

An Introduction and Overview to Google Apps in K12 Education was designed as an attempt to provide teachers with the knowledge about the capabilities of the Google Apps tools that would motivate them to learn more and incorporate these tools in their teaching, learning, and management activities in the school setting.

Instructional strategies

The module was designed to address and incorporate the principles of the ARCS model of designing the motivational aspects of learning environments in order to stimulate the participants' desire to incorporate these tools in their professional practice. (Keller, 2011) The intrinsic desire of most K12 teachers to improve their practice was reinforced by engaging video presentations on the relevance of the use of the various Google tools in the classroom and school setting. Open-ended questions at the bottom of the sections that asked participants to propose ways that the tools might be used in their own practice encouraged confidence and satisfaction that they could successfully implement the solutions.

Technologies

This instructional module was produced solely with Google Docs and Apps. The website and wiki were created using Google Sites and the video content was embedded from YouTube. This was done primarily to model for participants the uses and flexibility of the Google tools. The web-based format for the module was chosen because it gave the participants the opportunity to access the information at a time and in a place of their choosing. The module and its components were optimized to display on mobile devices. The module was tested on laptop and desktop computers as well as on Android and IOS smartphones and tablet devices.

The instructional module consisted of the following sections: 1- welcome page, 2- consent to participate (Google Form), 3- preliminary assessment (Google Form), 4- overview, 5- Docs, 6- Forms, 7- Sites, 8- post-assessment (Google form) 9- extras, 10- references

Participant population

Participants in this instructional module were solicited in several ways. Emails were sent to graduate student groups within the Department of Educational Technology at the University of Hawai‘i at Mānoa inviting participation. Invitations to participate were also posted on social media pages whose membership consists primarily of Hawaii-based K12 educators. School Administrators were invited to participate by private email. Participants in this project were provided with a web link to the module welcome page. (https://sites.google.com/site/gappsk12/home) Twenty participants responded and registered anonymously on the participant consent page. The participant group comprised fifteen females and five males. Eleven of the participants had Master's degrees or Professional Diplomas, eight had Bachelor's degrees, one possessed a Doctorate, and one was unspecified. Eleven of the participants (55%) indicated that they are currently employed as K12 teachers. Twenty participants began the module. Eighteen of these completed the post-module evaluation.

Data Collection

Quantitative and qualitative data to assess the present perceived levels of understanding were collected in a preliminary assessment, a post-module assessment and from open-ended response opportunities at the conclusion of the different sections of the module. Each of the data collection instruments was produced using Google Forms and responses were saved on a Google spreadsheet.

The preliminary assessment consisted of three demographic questions, seven questions concerning general use of digital technologies and perceived skill level, and six questions dealing specifically with the participants' experience with Google Docs and Apps. All of the questions were answered on a five point Likert scale.

The post assessment was administered to determine the perceived effectiveness of the Instructional module. It comprised five Likert scale questions asking about the efficacy of the instructional module, four questions dealing with the possible classroom use of Google tools, three questions concerning the desire for further instruction and three open-ended text questions concerning the module design and how it was accessed.

Open-ended text response opportunities followed the content sections. These asked classroom specific questions such as "Can you suggest some ways that you might be able to use one or several of these Apps together in the classroom?"

Results

The preliminary assessment indicated some commonalities among all of the participants (Table 1.) Smartphone use, work and home computer and social network use were nearly universal among participants.

Table 1. Preliminary assessment: digital technology and Google tools use

Variable	N	Mean	Std Dev	Variance
Smartphone use	20	4.05	1.43	2.05
Tablet use	20	4.00	1.41	2.00
Work computer	20	5.00	.00	.00
Home computer	20	4.75	.91	.83
Cloud use	20	3.95	1.43	2.05
Social network	20	4.45	.94	.89
Skill level	20	3.70	.80	.64
Gmail use	20	3.75	1.33	1.78
Docs	20	3.70	1.38	1.91
Docs use	20	3.70	1.42	2.01
Collaborate	20	3.60	1.54	2.36
Sites use	20	2.25	1.55	2.41

Note. Values represent responses on a five point Likert scale 1= Strongly Disagree, 5= Strongly Agree

As the questions became more specific to use of and familiarity with Google Apps, the mean of the responses fell. This was more pronounced among the K12 teachers (55%) than those participants who were not K12 teachers (Figure 1.).

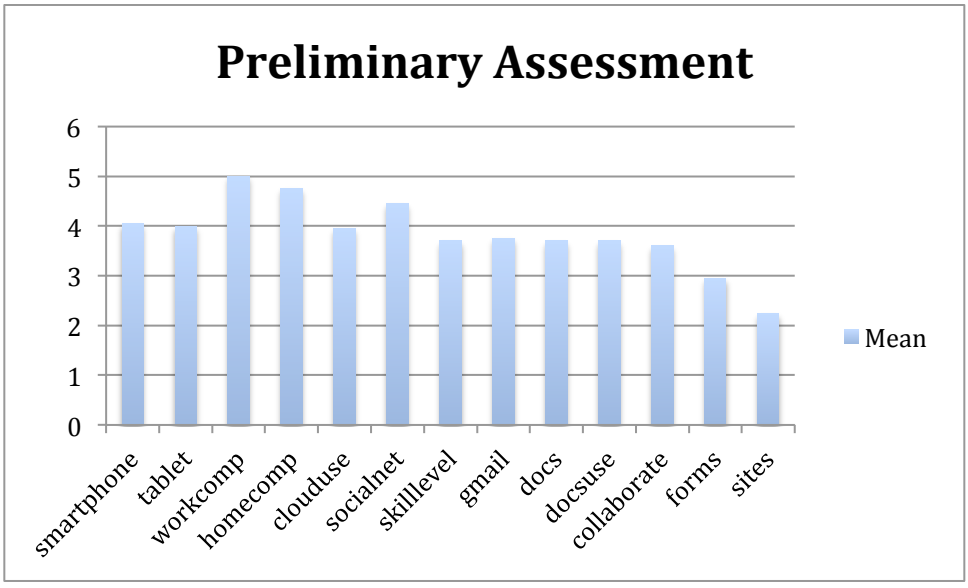

Figure 1. Means of responses to technology use questions.

The design and presentation of the module (IM-1 – IM-5) was well received. Participants agreed or strongly agreed that the module was clearly presented and that the level of instruction was appropriate and helpful for the target audience, K12 teachers without extensive experience using Google tools (Figure 2.).

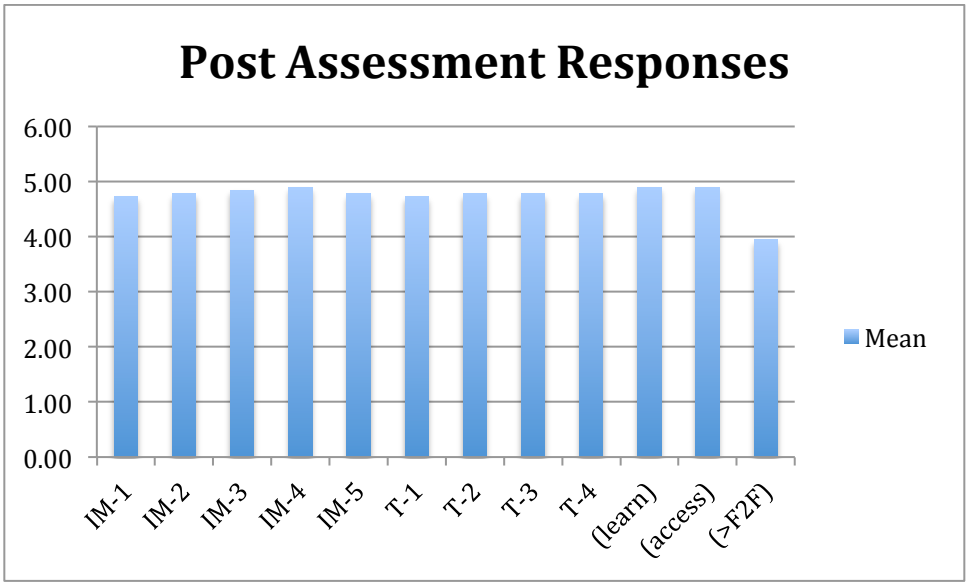

Figure 2. Means of responses to module and teaching questions

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The respondents very strongly indicated that the module helped them to understand the components of Google Apps. (Table 2.)

Table 2. Post assessment module evaluation.

Variable	N	Mean	Std Dev	Variance
IM-1. The module was clear and easy to understand	18	4.72	0.57	0.33
IM-2. The level of instruction seemed about right	18	4.78	0.43	0.18
IM-3. The examples and explanations provided in the module were helpful	18	4.83	0.38	0.15
IM-4. The module helped me to acquire a basic understanding of the components of Google Apps	18	4.89	0.32	0.10
IM-5. I am more interested in incorporating these tools professionally	18	4.78	0.43	0.18

Note. Values represent responses on a five point Likert scale 1= Strongly Disagree, 5= Strongly Agree.

The participants indicated a strong preference in the Post assessment for wanting to utilize Google Apps in classroom activities, in professional activities, and to use Google Sites and Forms. (Table 3, T-1 – T-4), Some of the text comments were: “I liked it very much. I would love to create content lessons for classes just like this.” “I want my PLC to watch this so we can start collaborating using the Apps.”

Table 3. Post assessment application to teaching.

Variable	N	Mean	Std Dev	Variance
T-1. I would like to use Google Apps tools to develop a classroom activity	18	4.72	0.57	0.33
T-2. I would like to use these tools professionally (e.g. in accreditation and other	18	4.78	0.43	0.18

Variable	N	Mean	Std Dev	Variance
school level projects)				
T-3. I would like to create a class site or wiki or have my students create them	18	4.78	0.43	0.18
T-4. I believe that Google Forms would be a useful tool in the classroom and/or school-wide	18	4.78	0.43	0.18

Note. Values represent responses on a five point Likert scale 1= Strongly Disagree, 5= Strongly Agree.

Implications and Discussion

Most of the participants in this module indicated that they were relatively competent consumers of digital technologies. Most used smartphones and other mobile devices. All used computers at work, most participated in social networking sites and a large number made use of cloud-based services. The K12 teacher participants however were not as familiar with the productive aspects and professional uses of the Google Apps suite as were other participants. As the participants worked through the module, they reported that they had acquired a greater knowledge of the components of the Google Apps suite and that they wished to incorporate the use of these tools professionally. It was interesting that while the participants strongly indicated that they would like to learn more and that they would like to have more access to modular training tools, they indicated less interest in a more traditionally centered face-to-face approach (Table 4.)

Table 4. Post assessment desire for more learning opportunities.

Variable	N	Mean	Std Dev	Variance
I would like to learn more about Google Apps and other "Cloud" tools	18	4.89	0.32	0.10
I would like to have greater access to self-paced modular training tools when I need them	18	4.89	0.32	0.10
I would prefer to have face-to-face instruction or a combination with online instruction about technology	18	3.94	1.30	1.70

Note. Values represent responses on a five point Likert scale 1= Strongly Disagree, 5= Strongly Agree.

While the idea of "just-in-time" professional training is not new in Business and Management (Wind & Relbstein, 2000), schools have been relatively slow to adopt the idea of using customized content and providing it to teachers at times and in places that best serve their professional and personal needs. Participants in this module however, were very positive about the format of the instruction. One wrote "I like the fact I can learn anywhere and anytime. I'm sitting on my couch at 9pm on a Friday night. I'm so busy that this fits my schedule."

Several of the participants asked for more modules dealing with the specific components. For example "I'm sure you're probably considering making modules for specific tools, such as a module just for Google Slides." and "I was left wishing I could have learned more since I want to do this."

Conclusion

This introductory instructional module was initially conceived to address a specific situation at a State of Hawaii public elementary school. The teachers at that school did not know, for the most part, that their school had a Google Apps subdomain. The majority of the teachers in the school were also not aware of how the Google Apps suite could be used in the classroom. Like other public school teachers in this state, they have seen time devoted to workday professional development virtually disappear over the past few years. Because of the time constraints imposed by the process to obtain research approval within the Hawaii Department of Education (HIDOE), it was decided to present this module instead to a broader audience.

One of the issues mentioned by several participants is a problem common to projects involving rapidly changing technologies. During the period of time between the development of the module and when it was presented to the participants, some of the information contained in the YouTube videos had become dated. This led to some participant confusion. One participant though, reported "…I had to search around a little until I found it under 'drive'. But in doing so, I learned to better navigate the system." A more important problem was the use of YouTube videos themselves. Since YouTube is blocked within the HIDOE, participants who were public K12 teachers or administrators could not access the module from their work computers. One participant reported beginning the module on a smartphone at work and completing it at home on a personal computer. When this overview and subsequent content-specific modules are introduced for school use, it will be necessary to produce custom video material in order to make access as flexible as possible.

The data collected during the course of this project does suggest several important conclusions. Teachers in the K12 setting, even those who describe themselves as possessing average technological skills, are not familiar with the integration of a cloud-based productivity solution like Google Apps in their professional practice. They are interested in learning more about doing so. A flexible and customized web-based delivery of information that is not time or place dependent is desirable.

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